

Environmental problem perception of 6th grade students

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Abstract

This study aims to examine and compare the 6th grade students' perceptions of environmental issues through different techniques. For this purpose, we have tried to establish the students' perceptions of environmental issues by studying the pictures they drew and the written texts they wrote. In this study, which we have conducted with 62 students in two different secondary schools in Duzce Central during the 1st semester of the 2014-2015 academic year, we have employed a phenomenological pattern. The obtained data have been analysed using a content analysis method. As a result of the study, the themes of air pollution, water pollution, soil pollution, visual pollution, endangerment of species, noise pollution, natural disasters, biological pollution and radioactive pollution in the students' perceptions of environmental issues have been identified. When the themes of environmental problems, obtained through two different techniques, have been compared, it has been established that the number of themes expressed in the written texts are higher than the ones in the pictures.

Keywords: Environmental problems, students' drawings, students' writing.

1. Introduction

Environment is the natural habitat on which living beings depend and which they affect and are affected by it (Atasoy, 2006). Environment extends over a large swath of areas and constitutes a habitat where all the living beings are in interaction with each other (Haftaci & Soylu, 2007). Environment is the biological, physical, social, economic and cultural habitat in which the living beings maintain their relationships throughout their lives and are in mutual interaction (Gokmen, 2011:38). For this reason, alteration of the environment through various interventions affects the living beings sharing that particular environment.

The environment -being important for all living beings- has been subject to increasing pollution and destruction in line with rapid industrial and technological development. As a result of the consumption of natural resources for addressing the raw material needs and, due to the ever-increasing production of waste, the unintentional acts of humans end up damaging the environment. Nowadays, however, environmental problems cause serious consequences and pose a threat to the lives of all the creatures living in it (Secgin, Yalvac & Cetin, 2010).

Environmental problems are the kind of problems that arise as a result of the negative consequences felt by living beings, and affect them in a negative way. Rapid population growth and the question of housing, energy issues, desertification and drought, destruction of forests, erosion, mudslides, floods, avalanches, extinction of species, air pollution, water pollution, soil pollution, global warming etc. are but a few of the major environmental problems that threaten the future of the world and thereby set the agenda of the countries around the world. Rapid population growth, unplanned urbanisation and irresponsible waste discharge pollute the environmental elements such as air, water and soil; while the squandering of natural resources and lack of education accelerate the disruption of the natural equilibrium.

The most important characteristic of environmental problems is that they are global in terms of their consequences, not local. The consequences of the environmental issues affect everybody regardless of their religion, language, race, age, gender, wealth, profession, social class and intellectual capacity (Erten, 2005). Environmental issues have become a concern for the whole world and are increasingly being included in the activities and agreements of international organisations (Haftaci & Soylu, 2007). The reason why environmental issues have become such an encompassing hazard for the world boils down to people's unawareness of the environmental issues and their irresponsible and cruel attitude towards nature for their own selfish gains. Global warming, the greenhouse effect, ozone depletion, destruction of rain forests, disruption of the natural equilibrium, air and water pollution are some of the most prominent examples of the global environmental issues (Tuna, 2000). Moreover, noise pollution, erosion, desertification, water, air and soil pollution cause disruption of the natural harmony and bring about a myriad of issues as a consequence. All of the above facts underscore the necessity and importance of environmental education. The main purpose of environmental education is to improve, preserve and better the environmental values that constitute the habitat for the existing and future generations in every respect (social, economic, physical etc.) without compromising the quality and existence of the resources that future generations will rely on. (2872, Environmental law). While environmental education teaches ecological information, it also serves to improve people's attitudes towards the environment and transforms such attitudes into action. Environmental education addresses students' cognitive, affective and psycho-motor learning areas (Unterbruner, 1991). Environmental education is a lifelong learning process that initially starts within the family and continues in pre-school education and thereafter. The most important phase of the environmental education is doubtless the primary school years.

In order to raise environmental consciousness and environmentally conscious individuals and ensure that such an environmentally conscious mindset is perpetuated, it is necessary that people from all walks of life are actively engaged in environmental activities and that they are taught environmental education (Genc, 2015). Such an education can be given at home, school and in social

life. Environmental education should start at home and continue at school through a peripheral and a formal academic curriculum (Tozlu, 1997). However, Saylan and Blumstein (2011) suggest that environmental education has failed in terms of maintaining biodiversity, prevention of the effects of climate change and changing attitudes and behaviour towards the environment. So, the use of different techniques in environmental education is important (Genc, 2013).

Children can express their feelings, opinions, views and thoughts on the subject in various ways. For instance, they can express their knowledge and thereby their opinion based on such knowledge verbally or in writing or by illustration. Written texts can help refresh children's memories and teach them new information. The written form enables a student to think logically based on their observational skills, to conjure them up in their minds and use their native language to express such thoughts and observations (Belet & Turkkan, 2007).

Children can also express their thoughts and feelings visually by drawing. Drawing a picture is one of the most instrumental methods for children to express themselves. Drawing a picture is a means of expressing a child's opinion in much simpler and stronger terms than even some of the previously learned words and expressions (Artut, 2007).

While the studies investigating children's attitudes towards the environment are important in shedding light on the environmental education to be designed for them (Akilli & Genc, 2015), it is also important to understand how they perceive and explain the environment and environmental issues by delving deeper into the matter and using an open ended approach. This is because what lies underneath the attitude, awareness and knowledge acquired by a person is the person's ability to explain the phenomena (Genc & Akilli, 2016). There are no studies conducted on children's perceptions of the environment in our country, but there are some that have been conducted abroad (Yardimci & Bagci-Kilic, 2010). For this reason we need more studies to be conducted in our country on the subject of students' perceptions of the environment and environmental issues. In this study we have examined both the students' environmental consciousness and their knowledge and opinions on environmental issues. We believe that the present study, using qualitative methods, will contribute to the literature on environmental perception and consciousness.

The purpose of the study is to examine the students' knowledge, opinions and thoughts on environmental issues by way of written texts and drawings. In this respect answers to the following questions have been sought.

1. How did the students express their thoughts on environmental issues in the pictures they drew?
2. How did the students express their thoughts on environmental issues in the written texts they wrote?
3. Is there any difference between the pictures and written texts?

2. Method

The present study employs a phenomenological pattern as a qualitative research pattern. Phenomenological studies usually concentrate on finding out and interpreting individual perceptions or perspectives regarding a certain phenomenon. We come across the phenomena in various ways such as events, experiences, perceptions, tendencies, concepts and circumstances in our everyday lives. However this does not necessarily mean that we actually realise what the phenomena are that we face. For this reason, phenomenology provides an ideal method for studying the facts that are not entirely unknown to us but also which we fail to grasp fully (Simsek & Yildirim, 2011). We have chosen a phenomenological pattern in this study in order to study the students' perceptions of environmental problems.

2.1. Study Group

This study has been conducted with 62 6th grade students in two secondary schools in Duzce province. Of the students within the age group of 11-12; 28 of them were male, 34 were female. This study has employed a measure sampling method, one of the purposeful sampling methods. This particular sampling method allows researchers to study the cases that meet a number of pre-determined criteria. The said criteria could either be a pre-determined criteria list or be created by the researchers themselves (Yildirim & Simsek, 2011). The criteria set by the researchers in this study are as follows: being a 6th grade student in a secondary school located in the province of Duzce and willing to take part in this study. 62 students volunteered to participate in the study. The subject of environmental gains is available in the natural science curriculum in all grades of the primary school (Erduran-Avci & Oz, 2012). For this reason, the study was conducted with the 6th grade students in order to study their perceptions of environmental problems during the first year of their secondary school education.

2.2. Data Collection Tools

The students' perceptions of environmental problems have been studied using two different techniques. Firstly, they were asked to draw pictures about environmental issues. The students were allowed to use whatever colour or crayon they wished. An entire lesson time was devoted to the drawing of the pictures. Secondly, the students were asked two questions: (1) What did you want to tell in your picture? (2) What are the most important environmental problems in your opinion? The students answered these questions in writing.

2.3. Data Analysis

Both the pictures and the written texts have been analysed through content analysis method. According to Yildirim and Simsek (2011), the main purpose of content analysis is to bring together the ostensibly matching data under certain contexts and themes and interpret them by arranging them in an understandable manner.

The literature on the main environmental problems has been studied prior to analysing the data. Based on the relevant literature, an environmental problems code list has been created. The researchers have made use of this list while coding the data obtained from the students. During the analysis of the written texts, four researchers first of all studied the students' written texts separately and identified the codes regarding the subject matter. Secondly they identified the matching codes out of the ones that they individually determined beforehand. A discussion group was formed for the non-matching codes. The cases of "consensus" and "difference" have been identified in the comparison and they have been calculated using the reliability formula ($\text{reliability} = \frac{\text{consensus}}{\text{consensus} + \text{difference}} \times 100$) (Miles & Huberman, 1994). A 90% consensus has been reached in determining the concepts used in their written texts.

The content analysis of the drawings, however, was performed in three stages. First of all, the pictures were subject to a preliminary examination by all the researchers involved in the study. This examination sought to establish whether the drawings were relevant to the matter in hand and made any sense. Once it was established that all the drawings were relevant to the topic and they made sense, they were numbered. Four of the researchers individually studied the pictures and identified the themes of environmental issues and sub-categories addressed by each student. Secondly, the four researchers brought together the themes and discussed the matter by re-examining the pictures. At this stage, the researchers were divided into two groups. All the identified themes were studied separately by the two groups. In the third stage, the themes of environmental issues identified by both groups were compared to each other. About a 90% consensus was reached regarding the

pictures. The frequencies and percentages of the themes were calculated in order to make a comparison of the qualitative data (Yıldırım & Simsek, 2011).

3. Findings

The themes established as a result of the content analysis of the students' pictures and written texts have been presented in Table 1 below.

Table 1. Themes of environmental issues in the students' pictures and written texts

Environment al Problems Themes	Sub-categories	Drawings				Writing texts			
		f	ft	%	T%	f	ft	%	T%
Air pollution	Factory smoke	37		59,68		29		46,77	
	Exhaust fumes	23		37,10		17		27,42	
	Perfumes and deodorants	3		4,84		4		6,45	
	The fumes from the chimney	6		9,68		7		11,29	
	Cigarette smoke	6	82	9,68		5		8,06	
	Landfill gas	2		3,23	45.56	3	75	4,84	42.37
	Mud rain	1		1,61		1		1,61	
	bad smell	1		1,61		4		6,45	
	Acid rain	1		1,61		1		1,61	
	Depletion of the ozone layer	-				1		1,61	
	Forest fires	1		1,61		2		3,23	
	Traffic	1		1,61		1		1,61	
	Factory waste	20		32,26		12		19,35	
Water pollution	The garbage thrown into the sea	9	37	14,52		11		17,74	
	Involved in waste water	4		6,45		3		4,84	
	Garbage thrown into rivers	3		4,84	20.56	4	33	6,45	18.64
	The garbage thrown into the lake	-				3		4,84	
	Ship waste	1		1,61		-			
Soil pollution	Domestic waste	17	29	27,42	16.11	15	29	24,19	16.38
	Other Waste	12		19,35		14		22,58	
Noise pollution	Car loudspeaker	1	3	1,61		1		1,61	
	Horn	1		1,61	1.67	-	2		1.13
	Stadium noise	1		1,61		1		1,61	
Light pollution	Unnecessary lighted lights	1	1	1,61	0.56	1	1	1,61	0.56
Naturel disaster	Earthquakes, floods, erosion, landslides	1	3	1,61		2		3,23	
	Hose	1		1,61	1.67	-	2		1.13
	Melting of glaciers	1				-			
Damage to living species	Cutting of trees	6		9,68		13		20,97	
	Combustion of wood	4	13	6,45		5		8,06	
	The extinction of living	2		3,23	7.22	3	21	4,84	11.86
	Defoliation	1		1,61		-			
Visual pollution	Throwing garbage in the ground	12	12	19,35		13		20,97	
	Unconscious construction	-			6.67	1	14	1,61	7.91

3.1. Pictures

Table 1 reveals eight distinct themes in the students' pictures: Air pollution, visual pollution, water pollution, soil pollution, noise pollution, natural disasters, light pollution and the endangerment of species. The theme of factory chimneys polluting the air was the most dominant one in the pictures by 59, 68%. The students depicted air pollution with drawings of exhaust fumes, factory smoke, cigarette smoking, smoke from chimneys and landfill gas. The exhaust fumes ranked second in the most depicted environmental issues in the pictures by 37.1%. Of the sub-categories of water pollution; factory waste appears to be the most depicted water pollution type by 32.26%. The students have tried to depict water pollution by drawing industrial waste fluid and medical waste being discharged into the water and the pollution of seas and rivers through the waste being discharged by ships. The theme of endangerment of species stands out as the most depicted sub-category through the drawings of trees being cut down. The students have drawn pictures about species becoming extinct, fish dying, flowers withering away, forests burning, trees drying and being cut down. The theme of visual pollution has been identified in the pictures by 6.67%. This particular theme was depicted with the drawings of litter being thrown to the ground and unplanned constructions being built. The least depicted themes in the students' pictures were noise pollution and natural disasters. Soil pollution was depicted in the pictures with drawings of waste batteries and plastic waste. The students depicted soil pollution with drawings of waste batteries thrown to the ground, agricultural chemicals, household waste, medical waste and plastic waste. Some of the examples of the students' pictures are provided in the Figures 1, 2 and 3.

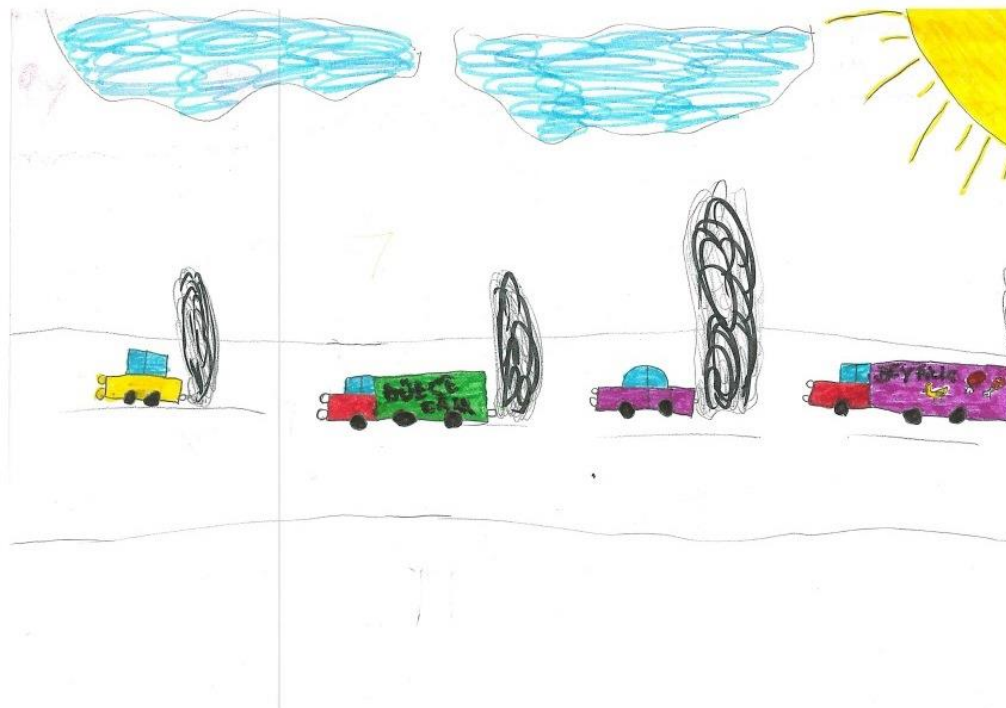


Figure 1. One of the examples of the students' pictures



Figure 2. One of the examples of the students' pictures



Figure 3. One of the examples of the students' pictures

3.2. Written Texts

In their written texts, the students have expressed their thoughts on the themes of environmental problems including air pollution, water pollution, visual pollution, soil pollution, noise pollution, light pollution, natural disasters and the endangerment of species. The most recurring themes in the written texts are air pollution (42.37%), water pollution (18.64%) and soil pollution (16.38%). According to their written texts, the majority of the students wanted to have the air pollution issue (industrial fumes) fixed; but they also stated that they want to tackle the issues of noise pollution, environmental pollution and waste.

According to Table 1, it is seen that the examples for the sub-category of industrial fumes within the general theme of air pollution was emphasised more than the others, while references were also made to the sub-categories of exhaust fumes, cigarette smoking and landfill gas. As for the theme of water pollution, the examples were given mostly about the issue of fluid waste being discharged by factories. But the issues of medical waste being mixed with water, pollution of the seas and rivers were also mentioned in the written texts. The theme of visual pollution was mentioned less than other two themes. The example given for this particular theme was mostly about litter being thrown on the ground. When we examine the soil pollution theme, we see that the term 'waste' was used, but the types of waste (such as waste batteries, medical waste and plastic waste) were not specified as in the case of the sub-categories. Again, with the noise pollution theme, the issues associated with the noise from vehicle exhausts sub category were mentioned; but no mention was made about the sub-categories of loudspeaker and factory noises.

3.3. Comparison of the Pictures with the Written Texts

When the data -obtained through two different techniques- on the students' perception of environmental problems were compared, it was established that there was an equal number of themes (8 themes) between them. The pictures and written texts of the students included the themes of air pollution, water pollution, endangerment of species, visual pollution and soil pollution; while their written texts included the themes of air pollution, water pollution, visual pollution, soil pollution, noise pollution and endangerment of species.

When we look at Table 1, we see that the themes of endangerment of species and visual pollution are more prominent in the students' written texts than in their pictures. The air pollution theme appears to be more dominant than other themes in both techniques. Water pollution is the second most addressed theme in both techniques. When all the themes of environmental issues in Table 1 are taken into consideration, it seems that the ratio of their being depicted in the pictures is higher than their being mentioned in the written texts. For instance, while the soil pollution theme is depicted in the pictures at the rate of 45.56%, it is mentioned in the written texts at the rate of 42.37%.

4. Discussion and Conclusion

As a result of this study, the themes of air pollution, water pollution, soil pollution, visual pollution, endangerment of species, noise pollution, natural disasters, biological pollution and radioactive pollution in the 6th grade students' perception of environmental issues were identified. These themes were identified through the pictures and written texts prepared by the students. The results obtained through these techniques and the comparisons made have been discussed below in line with the research question.

The most recurring themes in the students' drawings are the themes of air pollution (45.56%), water pollution (20.56%) and soil pollution (16.11%). The theme of visual pollution has been identified

in the pictures by 6.67%. The litter on the ground was the most used figure for describing the visual pollution theme by the students. Light pollution was the least depicted theme in the students' pictures (0.56%). The students described soil pollution using the images of household waste and other waste imagery. The air pollution was depicted mostly by factory smoke, water pollution was depicted by the fluid waste being discharged from factories, and the endangerment of species was depicted by trees being cut down and set on fire. Another study investigating the environmental perceptions through drawings was conducted by Keinath in Nepal (2004). The children were asked to depict their perceptions of the environment today and 50 years ago in drawings. In comparison, it was established that there were no environmental issues in the pictures depicting the environment 50 years ago, while there were a number of environmental issues in the pictures depicting today, illustrated in the form of big buildings, pollution and industrialisation. Sadik et al. (2011) have studied the environmental problems reflected in children's drawings. They suggest that the behavioural pollution, destruction of forests, air pollution and endangerment of species are the environmental problems that are perceived by children. While they suggest that the ozone layer depletion, noise pollution, soil pollution and global warming are the environmental issues that children are least aware of.

The three main environmental problems that the students are most uncomfortable with are air pollution (42.37%), water pollution (18.64%) and soil pollution (16.38%). According to a similar study - conducted by Ozdemir et al. (2004), students from the department of medicine identify the most important three environmental issues as air pollution (37.5%), waste issues (36.2%) and destruction of forests (30.6%). Another study, conducted with students by Negev et al. (2010), points out the most important environmental issues as "solid waste, open area and air pollution, water pollution, sewer and noise pollution". In his study conducted with the 8th grade primary school students on identifying their thoughts about environmental issues, Yalcinkaya (2013) states that the students identified the most important environmental issues as: water pollution, air pollution, noise pollution, destruction of forests, waste issues, natural disasters, traffic accidents, shanty houses and visual pollution. As one can see from the studies conducted on this particular topic, the air pollution, water pollution, destruction of forests and waste issues are the most common themes in all of them despite the age difference of the students.

It is interesting that such current affairs as the ozone layer depletion, greenhouse effect and global warming have not been depicted or mentioned in the pictures and written texts of the students in this study. In their study conducted with 6th, 7th and 8th grade primary school students, Demirbas and Pektas (2009) suggest that the environmental issues resulting from environmental pollution, air pollution and waste issues are the most common issues experienced by the students in their everyday life. Similarly, Yilmaz et al. (2002) conclude that, despite having adequate knowledge on the waste and recycling issues and having been instructed in the chemistry topics covering acid rain, greenhouse effect and ozone layer depletion, the students' level of knowledge in these issues is not enough.

When the themes of environmental issues obtained through both techniques are compared, it is seen that the number of themes depicted by the students in drawings and written texts are equal. While the sub-category of unplanned constructions is not depicted in the pictures, it is mentioned in their written texts. It is established that the themes of visual pollution, soil pollution and endangerment of species are more frequently covered in the written texts than in the pictures.

Each cerebral hemisphere in our brain has different functions. Despite being the centres of different functions, however, they cooperate with each other in the process of performing cerebral functions. In other words, the brain works as one in performing its functions (Erduran-Avci & Yagbasan, 2008). Senemoglu (2004) argues that both cerebral hemispheres of the brain should be involved in the learning process for efficient learning. The use of verbal, written and visual aspects together in conceptual education may increase students' ability to associate the feeling and meaning at the same time by helping them mentally structure the concepts and what they are about (Erduran-Avci & Yagbasan, 2008; Sausa, 2001).

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